Remarks

The Office Action mailed 8 March 2006 has been received and reviewed. No claims have been amended, cancelled, or added. Therefore, the pending claims are claims 1-8, 10-17, and 19-25. Reconsideration and withdrawal of the rejections are respectfully requested in view of the remarks provided herein.

The 35 U.S.C. §103 Rejection

The Examiner rejected claims 1-8, 10-17, and 19-25 under 35 U.S.C. §103(a) as being unpatentable over the combination of Grimson et al. ("Using adaptive tracking to classify and monitor activities in a site", Proceedings 1998 IEEE Conference on Computer Vision and Pattern Recognition, Santa Barbara, CA, 1998 June 23-25; pages 22-29) (hereinafter "Grimson") and Stein ("Tracking from multiple view points: Self-calibration of space and time", Computer Vision and Pattern Recognition, 1999, IEEE Computer Society Conference on, Volume 1, 23-25 June 1999, pages 521-527) (hereinafter "Stein").

In rejecting all the pending claims, the Examiner alleges that all the limitations of the claims are described in Grimson, except that although "Grimson teaches of tracking multiple objects in a 'composite image' created using homography transform matrices" (matrices created by tracking moving objects in the video streams), "Grimson does not teach that a homography matrix should be created from the non-moving, i.e., static, objects in the video streams." However, the Examiner alleges that "Stein discloses an improvement to the system disclosed by Grimson, by first finding (Sections 1.1 and 3.3) a course homography matrix by tracking moving objects just as Grimson discloses" and then because "the initial alignment does not perfectly align the ground plane" . . . "Stein then refines the alignment by finding a homography transform matrix in using the static features of the video streams." As such, the Examiner alleges "it would have been obvious to one having ordinary skill in the art at the time of the invention to use the refined homography transform approach disclosed by Stein in the method taught by Grimson. The combination would allow for a more accurate alignment of the video streams. Thus more accurate information would be obtained from the composite video stream."

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations. *See* M.P.E.P. § 2143.

Applicants respectfully traverse the Examiner's rejection and submit that the references cited do not teach or suggest all the claim limitations of the pending claims.

Each of the independent claims 1, 11, 20, and 24-25 describe the use of a plurality of imaging devices to provide image data covering a defined search area. Each field of view of each imaging device includes a field of view portion which overlaps with at least one other field of view of another imaging device. Further, the claims set forth the selection and physical marking of the defined search area with a plurality of non-movable landmark points of commonality in field of view portions which overlap (e.g., points selected and physically marked on the non-movable ground during installation of the imaging devices as set forth on page 23, lines 9-18 of the pending application). Image data from the plurality of imaging devices is fused into a single image using a plurality of physically marked landmark points of commonality in field of view portions which overlap. The foreground information of the fused image data is segmented from background information of the fused image data and is used to provide object path data representative of at least one object path of one or more moving objects in the search area. The at least one object path is then operated on as described in the claims.

As acknowledged by the Examiner, Grimson does not describe all the limitations of such independent claims. For example, as stated by the Examiner, "Grimson teaches of tracking multiple objects in a 'composite image' created using homography transform matrices" (e.g., matrices created by tracking moving objects in the video streams) and "Grimson does not teach that a homography matrix should be created from the non-moving, i.e., static, objects in the video streams."

However, contrary to the Examiner's assertions, Stein does nothing to cure the defects of Grimson. Stein does indeed disclose an improvement to the system disclosed by Grimson by providing fine alignment of frames aligned in the manner provided by Grimson (e.g., using homography transform matrices created by tracking moving objects in the video streams). However, Stein does not appear to refine the alignment by finding a homography transform matrix using the static features of the video streams as alleged by the Examiner, and clearly does not teach or suggest selecting and physical marking the defined search area with a plurality of non-movable landmark points of commonality in field of view portions which overlap (e.g., points selected and physically marked on the non-movable ground during installation of the imaging devices as set forth on page 23, lines 9-18 of the pending application) and/or "fusing all the image data from the plurality of image devices into a single image using the image data corresponding to the plurality of physically marked landmark points of commonality in field of view portions which overlap" as recited, for example, in claim 1.

First, Stein does not select and physically mark the defined search area with a plurality of non-movable landmark points of commonality in field of view portions which overlap (e.g., points selected and physically marked on the non-movable ground during installation of the imaging devices as set forth on page 23 of the pending application). Rather, to perform the fine alignment of data such as obtained using the method of Grimson, Stein appears to "search for a homography matrix A_2 that minimizes the 'sum difference' between image 1 and the warped image 2" using a method such as described in Referenced Document [5], M. Irani, B. Rousso, and S. Peleg., "Recovery of Ego-Motion Using Image Stabilization" In CVPR, pages 454-460, Seattle, Washington, June 1994 (attached hereto, and hereinafter "Referenced Document [5]) (see, page 524 second column or Section 3.3 of Stein cited by Examiner). As such, no selection and physical marking is employed.

Second, it is clear from Stein and the Referenced Document [5] that the fine alignment is quite different than "fusing all the image data from the plurality of image devices into a single image using the image data corresponding to the plurality of physically marked landmark points of commonality in field of view portions which overlap" as recited, for example, in claim 1.

Stein indicates in Section 3.3 thereof that "robust direct-methods for planar alignment such as [5]" are used to refine the alignment. As recited in Referenced Document [5], the method used therein "does not rely on 2D motion information computed near depth discontinuities, where it is inaccurate, but on motion computed over an entire image." In other words, motion is still used to perform the fine alignment (see 1 Introduction, second to last paragraph of Referenced Document [5]).

Section 4 of the Referenced Document [5], entitled "Computing 2D Motion of a Planar Surface," describes how the technique for detecting multiple moving planar objects locks onto the one planar object and its 2D motion parameters. As further provided in the last three numbered paragraphs of Section 4, "2D motion models used in the gradual locking on a planar object are listed" as: "Translation" in which the "model is applied to the *entire* image to get an initial motion estimation" and "followed by segmentation to obtain a rough estimate of the object's location"; "Affine" in which the "model is applied only to the segmented region obtained in the translation computation step, to get an affine approximation of the object's motion" and in which the "previous segmentation is refined accordingly;" and "A Moving Planar Surface" in which the "model is applied to the previously segmented region to further refine the 2D motion estimation of the planar object, and its segmentation."

The algorithm is further summarized in the Section 5 Concluding Remarks of the Referenced Document [5]. Generally, "first, an image region corresponding to a planar surface in the scene is detected, and its 2D motion parameters between successive frames are computed. The 2D transformation is then used for image warping, which cancels the rotational component of the 3D camera motion for the *entire* scene, and reduces the problem to pure 3D translation."

From the description in the Referenced Document [5], the refinement process is quite different than "fusing all the image data from the plurality of imaging devices into a single image using the image data corresponding to the plurality of physically marked landmark points of commonality in field of view portions which overlap" as recited, for example, in claim 1. No physically marked landmark points are used for any computations. In fact, it is clearly stated that the method relies "on motion computed over an entire image." Reliance on motion models

is quite different than using physically marked non-movable landmark points in the search area (e.g., the actual area being image such as the ground, parking lot, etc.) to fuse the overlapping images.

The fusion in Grimson, and the subsequent refinement in Stein, is completely different than that described in the pending claims. In the pending claims, the fusing of image data from the plurality of imaging devices into a single image employs using a plurality of physically marked non-movable landmark points of commonality in field of view portions which overlap (i.e., landmark points physically marked in the search area). For example, fusion (e.g., calibration) may employ computing respective homography matrices based on the identification of several landmark points physically marked on the scene and sampled through a user interface.

Neither Grimson or Stein show such fusion of images. As such, for at least the above reasons, the pending independent claims 1, 11, 20, and 24-25 are not obvious in view of the cited references.

Further, the remainder of the rejected claims (i.e., claims 2-8, 10, 12-17, 19, and 21-23) respectively depend on one of the independent claims, either directly or indirectly. Therefore, they include the limitations of the respective independent claim upon which they depend. As such, these claims are also not obvious over Grimson and Stein for the same reasons as provided above.

Summary

It is respectfully submitted that the pending claims are in condition for allowance and notification to that effect is respectfully requested. The Examiner is invited to contact Applicants' Representatives, at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

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CERTIFICATE UNDER 37 CFR §1.8:
The undersigned hereby certifies that the Transmittal Letter and the paper(s), as described hereinabove, are being transmitted by facsimile in accordance with 37 CFR §1.6(d) to the Patent and Trademark Office, addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 5 day of June, 2006, at 10:20 A.M. (Central Time).

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